

Course Code	Course Title	L	T	P	C
1154EC104	BUILDING AUTOMATION	3	0	0	3

a) Course Category

Institutional Elective

b) Preamble

Security of the building and safety of personal are becoming important aspects nowadays and in near future, it will be in a great demand. Complex infrastructure requires a variety of building automation and control systems. Building Management System (BMS) is computer-based control system installed in building that controls and monitors the total MEP (Mechanical – Electrical – Plumbing) and security structure.

c) Prerequisite

Nil

d) Related Courses

Industrial Automation

e) Course educational objectives

1. Gain knowledge on Building Management System (BMS) and Automation.
2. Be familiarized with various transducers and sensors in BMS.
3. Be exposed on Control panel and Communication.
4. Learn Fire Alarm System (FAS) and security system such as CCTV.
5. Gain knowledge on Energy Management in Building Automation.

f) Course Outcomes

On successful completion of this course, the students will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
C01	Understand Building Management system and Automation.	K2
C02	Describe various Sensors and Transducers - Automation components in BMS	K2
C03	Explain control panel and communication such as HVAC and Modbus.	K2
C04	Describe FAS and Security Systems in Building Automation.	K3
C05	Understand the Energy Management systems.	K2

g)	Correlation of COs with POs													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1														
CO2														
CO3														
CO4														
CO5														

h) Course Content

UNIT I INTRODUCTION TO BUILDING MANAGEMENT SYSTEM AND AUTOMATION 9

Concept and application of Building Management System (BMS) and Automation, requirements and design considerations and its effect on functional efficiency of building automation system, architecture and components of BMS

UNIT II AUTOMATION COMPONENTS IN BMS 9

Temperature Sensors: RTD, Thermistor, Thermocouple, Bimetallic strip - Pressure Sensors: Diaphragm type, piezoelectric sensors – Different types of mounting of pressure sensors in duct, rooms and pipes – Air flow sensor: Anemometer, velocity pressure sensors – Flow sensors: Turbine flow meter, Orifice, Venturi, Pitot tube, ultrasonic flow meter – Different types of mounting for air & water flow meters

UNIT III CONTROL PANEL AND COMMUNICATION 9

HVAC Control Panel, MCC Basics, Panel components; Communication Basics, Networks, BACNet, Modbus, LON.

UNIT IV FAS AND SECURITY SYSTEMS 9

Fire, Fire modes – Fire Alarm Systems components: Field components, panel components – FAS Architectures – Access Components, Access control system Design - CCTV camera types and operation – camera selection criteria – CCTV Applications.

UNIT V ENERGY MANAGEMENT 9

Energy Savings concept & methods, lightning control, Building Efficiency improvement, Green Building (LEED) Concept & Examples.

Total 45 Hrs

i) Learning Resources

Text Books

1. Understanding Building Automation Systems (Direct Digital Control, Energy Management, Life safety, Security, Access Control, Lightning, Building Management Programs) (Hardcover), Reinhold A. Carlson and Robert A. Di Giandomenico.
2. HVAC Systems Design Handbook, Fifth Edition, Roger W. Haines.
3. CCTV (Newnes), Vlado Damjanovski (1999).
4. Process control – Instrument Engineers Handbook by Bela G. Liptak, Chilton book co.

Reference Books

1. Building Control Systems, Application Guide (CIBSE Guide), CIBSE, 2000.
2. Smart Buildings by Jim Sinopoli, Butterworth-Heinemann imprint of Elsevier, 2 ed., 2010
3. Design of Special Hazards and Fire Alarm Systems, Robert Gagnon, 2007.